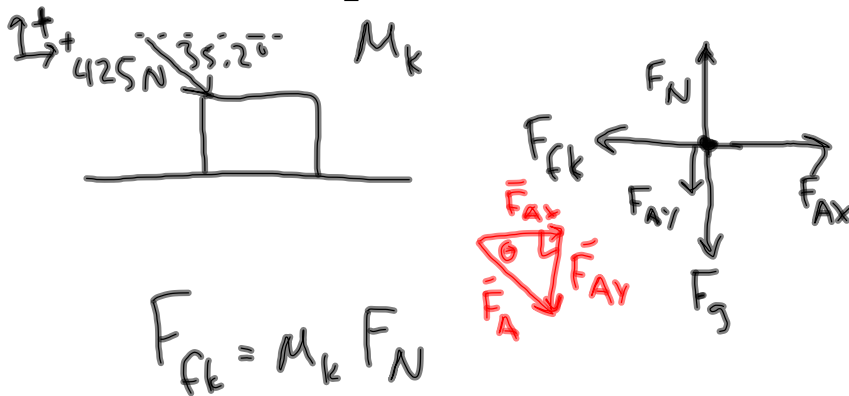


## Force Practice Problems 1st Block 9.20.11

A box of books weighing 325 N moves at a constant velocity across the floor when the box is pushed with a force of 425 N exerted downward at an angle of 35.2 degrees below the horizontal. Find  $\mu_k$  between the box and the floor.



$$\begin{aligned}\mu_k &= \frac{F_{fk}}{F_N} \\ &= \frac{347 \text{ N}}{570 \text{ N}} \\ &= .609\end{aligned}$$

$$\begin{aligned}\sum \vec{F}_x &= 0 \\ F_{Ax} - F_{fk} &= 0 \\ F_{fk} &= F_{Ax} \\ &= F_A \cos \theta \\ &= 347 \text{ N}\end{aligned}$$

$$\sum \vec{F}_y = 0$$

$$F_N - F_{Ay} - F_g = 0$$

$$F_N = F_{Ay} + F_g$$

$$= F_A \sin \theta + 325 \text{ N}$$

$$= 245 \text{ N} + 325 \text{ N}$$

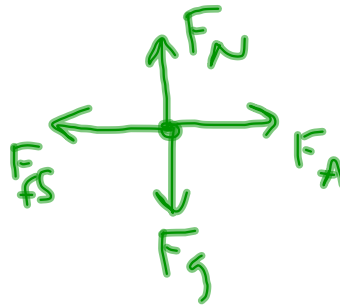
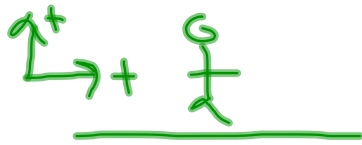
$$= 570 \text{ N}$$

### Force Practice Problems 1st Block 9.20.11

A 55 kg ice skater is at rest on a flat skating rink. A 198 N horizontal force is needed to set the skater in motion. However, after the skater is in motion, a horizontal force of 175 N keeps the skater moving at a constant velocity. Find the coefficients of static and kinetic friction between the skates and the ice.

$$\mu_s = .37$$

$$\mu_k = .32$$



$$F_{fs} = \mu_s F_N$$

$$\mu_s = \frac{F_{fs}}{F_N}$$
$$= \frac{198 \text{ N}}{539 \text{ N}}$$

$$= .37$$

$$\sum \vec{F}_x = 0$$

$$-F_{fs} + F_A = 0$$

$$F_A = F_{fs} = 198 \text{ N}$$

$$\sum \vec{F}_y = 0$$

$$F_N - F_g = 0$$

$$F_N = F_g = m a_g = 539 \text{ N}$$